to the cellular changes accompanying and causing the fall of leaves. As has long been known, there are two distinct processes involved: (a) that connected with the *separation* of the leaf from the stem, and (b) that of protecting the exposed surface. In Dicotyledons a *separation-layer* is formed, and the leaf separates from the stem by the disappearance of the middle lamellae of the cells of the separation-layer and the breaking of the seive tubes and vessels of the leaf-trace at that level.

The protective-layer, which is always formed, may be formed either before or after the leaf-fall. This layer is produced in two principal ways: (a) by the deposit of lignin and suberin in the walls of the cells of the leaf-base, either without any special division of the cells, or with only irregular divisions; and (b) by cells produced thru continued division of a regular cambiun, and later becoming ligno-suberized. The author indicates that these microscopic cellular differences have no relation, according to his studies, to the systematic position of the plants.

In the study of the premature fall of leaves, which in some plants followed the sharp cold of the late spring of 1910, the present reviewer found evidence that some plants were thus stimulated into the production of the separation-layer similar to that found in normal defoliation.

THE HERBACEOUS ARRANGEMENT OF ELEMENTS DERIVED FROM THAT OF THE WOODY TYPE

There has long been a general feeling among botanists that the continuous woody ring found in trees and shrubs represents a development from the herbaceous type, in which these bundles of elements are separated by wide spaces of parenchymatous tissue. It has been conceived that the isolated bundles have been fused into a continuous ring by the development of cambium across the broad medullary rays, and that in this way the bast and woody elements have increased at the expense of the rays.

Eames (Ann. Bot., January, 1911,) gives cogent reasons for believing that the ring type is the more primitive of the two arrangements and that the scattered bundles of the herbaceous type are

derived thru a dissection of this primitive ring by invasions of the parenchyma and by reduction of the bundle elements. He draws his proofs both from the known palaeontological types and from the development of some present-day herbaceous forms. He believes, therefore, that the exogenous herbs are of more modern development than the woody plants.

THE GROWTH OF SOMATIC CELLS WITHOUT THE BODY

M. T. Burrows (Jour. Exp. Zool., January, 1911; C. R., Soc. Biol. Paris, 1910,) continues the work of Harrison in cultivating dissociated cells of metazoa in coagulable lymph. He has succeeded in securing the growth of isolated tissues of chick embryos, and verified for the chick essentially what Harrison demonstrated for the tadpole—that nerve fibres grow directly from the nerve cells independently of the surrounding formations. Burrows was able to apply histological tests to the fibres. The fibres grow by the extension and retraction of the characteristic ameboid swellings that terminate them. The technic is complicated by the fact that the chick is warm-blooded.

In a similar way even adult tissues were made to grow successfully. The following tissues from dogs and cats grew under artificial conditions, both as to the specific differential cells of the organs and the connective tissue cells associated: the conjunctiva and the vascular and peritoneal endothelum; the lymphatic, thyroid and supra-renal glands; the spleen, the kidneys, the ovaries; cartilage and bone marrow.

It is worthy of note that such cultures only present cell growths; there seems to be no tendency for the cells to group themselves into their characteristic tissue forms.

ORIGIN OF ELEMENTS OF SYMPATHETIC SYSTEM

Kuntz (Jour. Comp. Neur., 1910,) discusses the origin and development of the sympathetic nervous system in birds and mammals. He concludes that the sympathetic system is homologous with the other functional divisions of the nervous system, has